INTERNATIONAL SEARCH REPORT

International Application No
PCT/IB2004/004115

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, WPI Data, PAJ, BIOSIS, EMBASE, CHEM ABS Data, EMBL

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	PASTINEN T ET AL: "Multiplex, fluorescent, solid-phase minisequencing for efficient screening of DNA sequence variation" CLINICAL CHEMISTRY, AMERICAN ASSOCIATION FOR CLINICAL CHEMISTRY. WINSTON, US, vol. 42, no. 9, 1996, pages 1391-1397, XP002126144 ISSN: 0009-9147	18
Y	page 1392, left-hand column; table 1	1-8,19, 20
X	WO 00/65088 A (AMERSHAM PHARM BIOTECH AB ; ULFENDAHL PER JOHAN (SE); WONG KIN CHUN (S) 2 November 2000 (2000-11-02) claims 12,14,21	18
Y	the whole document	1-8,19, 20

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 March 2005	11 07. 2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Hagenmaier, S

Form PCT/ISA/210 (second sheet) (January 2004)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	WORRALL T A ET AL: "Allele-specific HLA-DR typing by mass spectrometry: an alternative to hybridization-based typing methods." ANALYTICAL CHEMISTRY. 1 NOV 2000, vol. 72, no. 21, 1 November 2000 (2000-11-01), pages 5233-5238, XP002287583 ISSN: 0003-2700	1-8, 18-20
A	the whole document	9,12,13
Y	LEUSHNER JAMES ET AL: "Automated mass spectroscopic platform for high throughput DR Beta typing" HUMAN IMMUNOLOGY, vol. 61, no. Supplement 2, 2000, page S126, XP008032510 & 26TH ANNUAL MEETING OF THE AMERICAN SOCIETY FOR HISTOCOMPATIBILITY AND IMMUNOGENETICS; LAKE BUENA VISTA, FLORIDA, USA; OCTOBER 10-14, 2000 ISSN: 0198-8859	1-8, 18-20
A	abstract	9,12,13
Y	TOST J ET AL: "GENOTYPING SINGLE NUCLEOTIDE POLYMORPHISMS BY MASS SPECTROMETRY" MASS SPECTROMETRY REVIEWS, JOHN WILEY AND SONS, NEW YORK, NY, US, vol. 21, no. 6, November 2002 (2002-11), pages 388-418, XP009019382 ISSN: 0022-7037	1-8, 18-20
A	the whole document	9,12,13
Y	TOST JÖRG ET AL: "Molecular haplotyping at high throughput." NUCLEIC ACIDS RESEARCH. 1 OCT 2002, vol. 30, no. 19, 1 October 2002 (2002-10-01), page e96, XP002287584 ISSN: 1362-4962	1-8, 18-20
A	the whole document	9,12,13
Y	SAUER S ET AL: "EXTENSION OF THE GOOD ASSAY FOR GENOTYPING SINGLE NUCLEOTIDE POLYMORPHISMS BY MATRIX-ASSISTED LASER DESORPTION/IONIZATION MASS SPECTROMETRY" RAPID COMMUNICATIONS IN MASS SPECTROMETRY, HEYDEN, LONDON, GB, vol. 17, no. 12, 9 May 2003 (2003-05-09), pages 1265-1272, XP009019406 ISSN: 0951-4198	1-8, 18-20
A	the whole document	9,12,13

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	SAUER SASCHA ET AL: "Genotyping single-nucleotide polymorphisms by matrix-assisted laser-desorption/ionization time-of-flight mass spectrometry." JOURNAL OF CHROMATOGRAPHY. B, ANALYTICAL TECHNOLOGIES IN THE BIOMEDICAL AND LIFE SCIENCES. 25 DEC 2002, vol. 782, no. 1-2, 25 December 2002 (2002-12-25), pages 73-87, XP002287585 ISSN: 1570-0232	1-8, 18-20
A	the whole document	9,12,13
Y	WO 02/08462 A (LECHNER DORIS ; GUT IVO GLYNNE (FR); CT NAT DE GENOTYPAGE (FR)) 31 January 2002 (2002-01-31)	1-8, 18-20
A	the whole document	9,12,13
Y	ROZEMULLER: "Reference panels for sequence based typing: Selection criteria for HLA-A and HLA-B" 2000, , XP002287586 ISBN: 0-945278-02-0 Retrieved from the Internet: URL:http://www.ihwg.org/tmanual/TMcontents.htm> 'retrieved on 2004-07-05!	1-8, 18-20
A	Chapter 1-B	9,12,13
Y	WO 02/18659 A (HAPLOGEN LLC ; LIU XIANGJUN (US)) 7 March 2002 (2002-03-07)	1-8, 18-20
A	the whole document	9,12,13
Y	US 5 451 512 A (APPLE RAYMOND J ET AL) 19 September 1995 (1995-09-19)	1-8, 18-20
A	the whole document	9,12,13

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Box No. I Nucleotide and/or amino acid sequence(s) (Continuation of item 1.b of the first sheet)

1. With regard to any nucleotide and/or amino acid sequence disclosed in the international application and necessary to the claimed invention, the international search was carried out on the basis of:

   a. type of material

   [X] a sequence listing

   [ ] table(s) related to the sequence listing

   b. format of material

   [X] in written format

   [X] in computer readable form

   c. time of filing/furnishing

   [X] contained in the international application as filed

   [X] filed together with the international application in computer readable form

   [ ] furnished subsequently to this Authority for the purpose of search

2. [ ] In addition, in the case that more than one version or copy of a sequence listing and/or table relating thereto has been filed or furnished, the required statements that the information in the subsequent or additional copies is identical to that in the application as filed or does not go beyond the application as filed, as appropriate, were furnished.

3. Additional comments:

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Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:

2. ☐ Claims Nos.:
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:

3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.

2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.

3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:

4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

claims 1-8, 18-20 (all partially), 9, 12, 13 (completely)

Remark on Protest

☐ The additional search fees were accompanied by the applicant's protest.

☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

Invention 1 : claims 1-8, 18-20 (all partially), 9,12,13 (completely)

Method for HLA typing of HLA-A by the unambiguous determination of short DNA sequence elements at positions 98, 414,539,282,571,368,256,292,238 and 270 simultaneously on both parental alleles at a selected number of positions in HLA -A, comprised of the steps for each position
a) hybridising a combination of oligonucleotides complementary to all known sequence variants to a DNA strand upstream of a given position
b) carrying out a primer extension reaction with at least one of the four dNTP substrates substituted by a terminating analog
c) analysing the products by mass spectrometry, with the resulting masses allowing unambiguous identification of the used primers and added bases; kit for the implementation of such method; use of such method for screening of tissue donors.

Invention 2: 1-8, 18-20 (all partially), 10,14,15 (completely)

Method for HLA typing of HLA-B by the unambiguous determination of short DNA sequence elements at positions 539,419,559,412,272,362,302,363,206 and 369 simultaneously on both parental alleles at a selected number of positions in HLA-B, comprised of the steps for each position
a) hybridising a combination of oligonucleotides complementary to all known sequence variants to a DNA strand upstream of a given position
b) carrying out a primer extension reaction with at least one of the four dNTP substrates substituted by a terminating analog
c) analysing the products by mass spectrometry, with the resulting masses allowing unambiguous identification of the used primers and added bases; kit for the implementation of such method; use of such method for screening of tissue donors.

Invention 3: claims 1-8, 18-20 (all partially), 11,16,17 (completely)

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Information on patent family members

International Application No
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 0065088 A	02-11-2000	AU 5062500 A	10-11-2000
		WO 0065088 A2	02-11-2000
WO 0208462 A	31-01-2002	EP 1176212 A1	30-01-2002
		AU 8435101 A	05-02-2002
		CA 2417201 A1	31-01-2002
		EP 1303638 A1	23-04-2003
		WO 0208462 A1	31-01-2002
		US 2004053260 A1	18-03-2004
WO 0218659 A	07-03-2002	AU 8917701 A	13-03-2002
		CA 2421078 A1	07-03-2002
		CN 1501982 A	02-06-2004
		JP 2004520812 T	15-07-2004
		WO 0218659 A2	07-03-2002
		US 2003082549 A1	01-05-2003
US 5451512 A	19-09-1995	AU 2748592 A	06-05-1993
		BR 9204280 A	11-05-1993
		CA 2081582 A1	06-05-1993
		CN 1073484 A	23-06-1993
		EP 0540997 A1	12-05-1993
		FI 924999 A	06-05-1993
		JP 8066197 A	12-03-1996
		NO 924246 A	06-05-1993
		NZ 244924 A	26-07-1994
		ZA 9208374 A	13-05-1993

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Method for HLA typing of HLA-DRB1 by the unambiguous determination of short DNA sequence elements at positions 125,196,197,227,261,286,299,308,341 and 345 simultaneously on both parental alleles at a selected number of positions in HLA-DRB1, comprised of the steps for each position
a) hybridising a combination of oligonucleotides complementary to all known sequence variants to a DNA strand upstream of a given position
b) carrying out a primer extension reaction with at least one of the four dNTP substrates substituted by a terminating analog
c) analysing the products by mass spectrometry, with the resulting masses allowing unambiguous identification of the used primers and added bases; kit for the implementation of such method; use of such method for screening of tissue donors.

Inventions 4-246: claim 21 (partially)

Invention 4:
Use of the primer with Seq.ID 1 to carry out HLA typing.
..ibidem for inventions 5-246, i.e. each of the 242 primers listed in table IV,V and VI.
